

Application No. 10/700,136  
Response to Office Action

Customer No. 01933

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

RE: THE ALLOWABLE SUBJECT MATTER

The Examiner's indication of the allowability of the subject matter of claim 3 is respectfully acknowledged.

New claim 36 has been added to recite the allowable subject matter of claim 3 in independent form, including all of the subject matter of its parent claim 1. In preparing new independent claim 36, various minor revisions have been made to make minor grammatical improvements and to correct minor antecedent basis problems so as to put new claim 36 in better form for issuance in a U.S. patent.

No new matter has been added, and it is respectfully submitted that the revisions to new claim 36 are not related to patentability and do not narrow the scope of new claim 36 either literally or under the doctrine of equivalents.

It is respectfully submitted that new independent claim 36 is in condition for immediate allowance.

RE: THE SPECIFICATION

The specification has been amended to make two minor grammatical improvements. No new matter has been added, and it

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is respectfully requested that the amendments to the specification be approved and entered.

RE: CLAIMS 1-22 and 37

Claim 1 has been amended to clarify the feature of the present invention whereby the insulating film is formed of a single layer and covers the one surface of the semiconductor substrate. See protective film 5 in Fig. 1, for example.

In addition, claims 1-11, 13 and 16-22 have been amended to make some minor grammatical improvements and to correct some minor antecedent basis problems so as to put them in better form for issuance in a U.S. patent.

All of the informalities pointed out by the Examiner have all been corrected, and it is respectfully requested that the rejection under 35 USC 112, second paragraph, be withdrawn.

In addition, it is respectfully pointed out that claims 5-11 and 17-22 (which were withdrawn from consideration as being drawn to a non-elected species and invention) all depend from elected independent claim 1. Accordingly, it is respectfully requested that if and when claim 1 is allowed, claims 5-11 and 17-22 be considered on the merits and also allowed.

Still further, it is noted that new independent claim 37 has been added based on the disclosure in the specification at page 9, line 9 to page 11, line 2. And it is respectfully

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pointed out that new claim 37 is readable on the elected species of Fig. 1.

No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered.

#### THE PRIOR ART REJECTION

Claims 1, 2, 4 and 12-16 were rejected under 35 USC 102 or under 35 USC 103 as being anticipated by or obvious in view of USP 6,765,299 ("Takahashi et al"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

According to the present invention as recited in amended independent claim 1, a semiconductor device is provided which comprises a semiconductor substrate having a plurality of connecting pads on one surface, and an insulating film which is formed of a single layer and covers the one surface of the semiconductor substrate. As recited in amended independent claim 1, the insulating film includes: (i) a plurality of holes extending through the insulating film, each of the holes corresponding to one of the connecting pads, and (ii) at least one recess extending partially through the insulating film such that a bottom surface of the recess is depressed with respect to an upper surface of the insulating film in a direction of

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thickness of the insulating film. And as recited in amended independent claim 1, at least one interconnection is formed on one of the upper surface of the insulating film and the bottom surface of a corresponding said at least one recess, and the at least one interconnection is connected to a corresponding one of the connecting pads through a corresponding one of the holes in the insulating film.

As recited in new independent claim 37, moreover, a semiconductor device is provided which comprises a semiconductor substrate having a plurality of connecting pads on one surface, and a protective film formed of a single layer. As recited in new independent claim 37, the protective film includes: (i) a plurality of holes extending completely through the protective film, each of the holes corresponding to one of the connecting pads, and (ii) a plurality of recesses extending partially through the protective film such that the protective film has a plurality of recessed surfaces in the recesses which are lower than an upper surface of the protective film in a thickness direction of the protective film. And as recited in new independent claim 37, interconnections are respectively connected to the connecting pads through the holes in the protective film, and are provided on one of the upper surface and the recessed surfaces of the protective film.

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That is, as shown in Fig. 1, for example, according to the claimed present invention an insulating (protective) film corresponding to protective film 5 includes recess(es) 7 and holes 6. The recess(es) 7 do not extend completely through the film 5, and each recess has a bottom surface that is recessed from the top surface of the film 5. The holes 6 do extend through the film 5 and correspond to the connecting pads 2. The holes 6 may extend through the recess(es) 7 as shown in Fig. 1. Alternatively, as shown in Fig. 42, the recess(es) 107 and holes 6 may be separate. In either case, each recess has a bottom surface, such that even when a hole 6 is in the recess, the bottom surface of the recess is still present.

Accordingly, with the structure of the recess(es) of the claimed present invention, it is possible to inhibit the occurrences of short-circuits caused by ion migration between distribution wires (interconnections) and between distribution wires and bump electrodes, as described in the specification at page 43, lines 9-20.

On page 3 of the Office Action the Examiner asserts that the protecting layer 114 and some part of the resin 130 together correspond to the insulating film of the claimed present invention.

It is respectfully pointed out, however, that according to the present invention as recited in amended independent claim 1,

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the insulating film is formed of a single layer. And according to the present invention as recited in new independent claim 37, the protective film is formed of a single layer. (See film 5 in Fig. 1, for example.)

Therefore, it is respectfully submitted that the "composite insulating film" identified by the Examiner in Takahashi et al from the protecting layer 114 and a part of the resin 130, clearly does not correspond to the insulating film recited in amended independent claim 1 or the protective film recited in new independent claim 37.

In addition, it is respectfully submitted that Takahashi et al also clearly does not disclose, teach or suggest the recess recited in amended independent claim 1 or the recesses recited in new independent claim 37.

Indeed, it is respectfully submitted that Takahashi et al merely discloses that holes extending completely through the protecting layer 114 are provided in the protecting layer 114. And it is respectfully submitted that Takahashi et al does not disclose, teach or suggest a recess(es) in an insulating or protective film formed of a single layer, whereby each recess extends partially through the insulating film such that a bottom surface of the recess is depressed with respect to an upper surface of the insulating film in a direction of thickness of the insulating film, as according to the claimed present invention.

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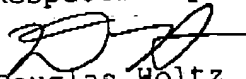
In view of the foregoing, it is respectfully submitted that amended independent claim 1, claims 2-22 depending therefrom, and new independent claim 37, all clearly patentably distinguish over Takahashi et al, under 35 USC 102 as well as under 35 USC 103.

\* \* \* \* \*

Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

  
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